

SAT I: Reasoning Test

Saturday, January 1997

Section 1 1 1 1 1 1 1

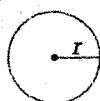
Time—30 Minutes
25 Questions

In this section solve each problem, using any available space on the page for scratchwork. Then decide which is the best of the choices given and fill in the corresponding oval on the answer sheet.

Notes:

1. The use of a calculator is permitted. All numbers used are real numbers.
2. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

Reference Information

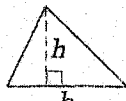


$$A = \pi r^2$$

$$C = 2\pi r$$



$$A = \ell w$$



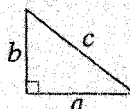
$$A = \frac{1}{2}bh$$



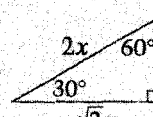
$$V = \ell wh$$



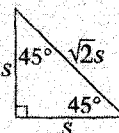
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



The number of degrees of arc in a circle is 360.
The measure in degrees of a straight angle is 180.
The sum of the measures in degrees of the angles of a triangle is 180.

- 1 If $x + y = 5$ and $x = 3$, then $3y =$

- (A) 6
- (B) 9
- (C) 12
- (D) 15
- (E) 18

- 3 If $2a - 6 = 10$, then $20 - 2a =$

- (A) -16
- (B) -12
- (C) 4
- (D) 14
- (E) 16

- 2 If every digit of a whole number is either a 3 or a 5, the number must be

- (A) prime
- (B) odd
- (C) even
- (D) divisible by 3
- (E) divisible by 5



Section 2

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Time—30 Minutes
30 Questions

For each question in this section, select the best answer from among the choices given and fill in the corresponding oval on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Medieval kingdoms did not become constitutional republics overnight; on the contrary, the change was ----.

- (A) unpopular
- (B) unexpected
- (C) advantageous
- (D) sufficient
- (E) gradual

A B C D E

- 1 Hoping to ---- the dispute, negotiators proposed a compromise that they felt would be ---- to both labor and management.

- (A) enforce. .useful
- (B) end. .divisive
- (C) overcome. .unattractive
- (D) extend. .satisfactory
- (E) resolve. .acceptable

- 2 Geneticist Olivia M. Pereira-Smith has published her findings on "immortal" cells, that is, cells that reproduce by dividing ----.

- (A) indefinitely (B) occasionally
- (C) conclusively (D) periodically
- (E) precisely

- 3 The unusually large herb *Gunnera* is difficult to study because it is found only in ---- areas.

- (A) fertile (B) hospitable (C) inaccessible
- (D) mundane (E) extensive

- 4 To ---- about craft clubs is not only ---- but foolish, for the focus of the clubs varies greatly from one town to another.

- (A) brag. .necessary
- (B) generalize. .difficult
- (C) complain. .important
- (D) rhapsodize. .fair
- (E) learn. .unproductive

- 5 The female subject of this painting by Henri Matisse seems ----, as if Matisse sought to portray an unconquerable female spirit.

- (A) ephemeral (B) indomitable
- (C) opulent (D) lithe (E) morose

- 6 Ironically, the same executives who brought bankruptcy to the coal fields were ---- by their contemporaries, who ---- the notion that these people were industrial heroes.

- (A) celebrated. .cherished
- (B) respected. .doubted
- (C) ignored. .belied
- (D) condemned. .rejected
- (E) antagonized. .enjoyed

- 7 Even though some people feel historians have an exclusive right to act as the interpreters of bygone eras, most historians insist their profession has no ---- interpreting the past.

- (A) interest in (B) responsibility in
- (C) consensus for (D) monopoly on
- (E) misgivings about

- 8 It is difficult to tell whether the attention new rock bands are receiving from audiences is that associated with ---- or that which indicates a durable ----.

- (A) novelty. .popularity
- (B) originality. .understanding
- (C) success. .sensation
- (D) longevity. .image
- (E) creativity. .production

- 9 Fenster schemed and plotted for weeks and these ---- were rewarded when Griswold was fired and Fenster was promoted.

- (A) circumlocutions (B) affiliations
- (C) gibberings (D) machinations
- (E) renunciations

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Each question below consists of a related pair of words or phrases, followed by five pairs of words or phrases labeled A through E. Select the pair that best expresses a relationship similar to that expressed in the original pair.

Example:

CRUMB : BREAD ::

- (A) ounce : unit
- (B) splinter : wood
- (C) water : bucket
- (D) twine : rope
- (E) cream : butter

(A) ● (C) (D) (E)

10 SEED : PLANT ::

- (A) pouch : kangaroo
- (B) root : soil
- (C) drop : water
- (D) bark : tree
- (E) egg : bird

11 SANDAL : FOOTWEAR ::

- (A) monarch : castle
- (B) child : parent
- (C) volume : bookcase
- (D) watch : timepiece
- (E) wax : candle

12 RENT : PROPERTY ::

- (A) sue : lawyer
- (B) hire : employee
- (C) pose : painter
- (D) pay : debtor
- (E) purchase : buyer

13 VIRTUOSO : MUSIC ::

- (A) bard : poetry
- (B) crescendo : scale
- (C) lyricist : melody
- (D) portrait : photography
- (E) critic : performance

14 AUDACIOUS : BOLDNESS ::

- (A) anonymous : identity
- (B) remorseful : misdeed
- (C) deleterious : result
- (D) impressionable : temptation
- (E) sanctimonious : hypocrisy

15 LULL : TRUST ::

- (A) balk : fortitude
- (B) betray : loyalty
- (C) cajole : compliance
- (D) hinder : destination
- (E) soothe : passion

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Each passage below is followed by questions based on its content. Answer the questions on the basis of what is stated or implied in each passage and in any introductory material that may be provided.

Questions 16-20 are based on the following passage.

In the following, a linguist reflects on changes in English language usage.

Linguistic manners are like any others. People have always found it worthwhile to reflect on how best to behave, for the sake of individual enlightenment and improvement. Since the eighteenth century, most of our great moralists have at one time or another turned their attention to the language, reflecting the conviction that the mastery of polite prose is a moral accomplishment to which we will be moved by appeals to our highest instincts.

The "improprieties" of traditional grammar are the usages that arise out of the natural drift of the meanings of words in the standard vocabulary. Obviously, we are not bound to use the language just as it was used a hundred years ago, but neither is it in our interest to change the language willy-nilly. Faced with a particular change, we need to ask if it involves real loss and if there is anything we can do to stop it.

The progressive loss of the distinction between the words *disinterested* (unbiased) and *uninterested* (apathetic) is regrettable; however, we might admit that the fight on behalf of the distinction is a lost cause. Nevertheless, I would not want to claim that there are no improprieties worth bothering about. Take the often-remarked use of *literally* to mean *figuratively*, as in, "We are literally drowning in red tape." If *literally* were going to shift its meaning away from *actually*, then it would have done so long ago; its stability is an indication that we are willing to reconsider our usage when the rationale is explained to us. Once the connection of *literal* with *letter* is made, the correct usage makes perfect sense. The distinction in this case is worth making.

Beyond the revision of traditional categories, new social conditions call for attention to aspects of language to which early grammarians were indifferent. Take the spoken language. Recent critics have been sensitive, with good reason, to the misuse of the phrases we use to orient the flow of talk, phrases like *I mean* and *you know*. In ordinary private conversation, the background of information we have in common is usually rich enough to enable us to fill in what is intended; and here

we rarely notice whether *you know* is being used appropriately or not. I am struck by the misuse of such expressions only when I am listening to public discourse: television interviews, for example. What is otherwise a natural appeal to a shared background is distressing because we do not know who the speakers are, as we do in face-to-face conversation, and we cannot ask them for clarification. Just as attention to rules of written usage helps us to read intelligently, so an awareness of the abuse of *you know* in public forums makes us better listeners.

16 As used in line 20, "progressive" most nearly means

- (A) improving
- (B) reformist
- (C) continuing
- (D) freethinking
- (E) futuristic

17 The author's attitude toward the loss of the distinction referred to in lines 20-22 is best described as

- (A) indifference
- (B) resignation
- (C) resentment
- (D) defiance
- (E) puzzlement

18 It can be inferred from the passage that the author approves most of modern users of language who

- (A) believe that meanings of words are purely arbitrary
- (B) treat public conversation as if it were private
- (C) recognize the reasons for particular usages
- (D) consider "the natural drift" of language to be inescapable
- (E) relax the rules of written usage

GO ON TO THE NEXT PAGE

2**2****2****2****2****2****2****2**

19 It can be inferred that "early grammarians" (line 38) had little reason to concern themselves with

- (A) the abuse of spoken language in public discourse
- (B) declining moral values
- (C) new and fascinating word meanings
- (D) conflicting rules of usage
- (E) the origins of linguistic rules

20 With which of the following statements relating to language usage today would the author be most likely to agree?

- (A) Rules of grammar define usage.
- (B) Television has little influence on language change.
- (C) Opinions of traditionalists should be largely discounted.
- (D) The study of polite prose is a moral accomplishment.
- (E) Changes in the language ought to be questioned.

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Questions 21-30 are based on the following passage.

In this passage a painter and sculptor from the United States recounts her first visit to Paris, made when she was in her sixties.

January 19: I fly on the night of January 23rd. I know that as my foot crosses the threshold of the airplane, my spirit will lift. In my guidebook I have scouted out the topography of Paris so that when I arrive I can align myself north, south, east, west. And I continue to review my French.

French money is engraved with the portraits of artists: Delacroix, de La Tour, Montesquieu, Debussy; I am astounded, and catch a distant trumpet of an entirely new point of view. I wonder if, by way of similar extraordinary facts that I cannot predict, I may feel more at home in Europe than on my deeply loved stretches of land in the United States. Something stubborn in me hopes not, and in recognizing that part of me I suddenly know why I never sought out Europe when, for years of my life, I had ample opportunity: I am afraid of its wisdoms, leery of challenge to the little developments of my own that I have struggled for and the independence of which I cherish, perhaps inordinately.

I am slightly chagrined—but also delighted—that an astute English artist has already observed in me limitations I only today perceived for myself. She writes: “I hope you are looking forward to Paris. I am sure you will find it a revelation to be in Europe—you will recognize so many sources of your thinking.”

January 24: Arrived at the airport in Paris at eight in the morning. Directed by three volubly helpful French people, I found a taxi which bore me to my daughter’s hotel by way of the Place de la Concorde, the Tuileries Gardens, and the Louvre*: a space conceived on the level of a grand linear dream underwritten by power into reality. An American voice in me remarked coolly, even as I marveled, “Now I understand the French Revolution; it’s wrong for any human being to have had this much power.” But all that is really none of my business now. The architectural space of Paris is an astonishment to me because its scale so accurately attunes inhabited earth to sky that I can actually walk in a work of art. I feel in some subtle way eased. I find myself in a world ordered by people of like mind to my own, in a compan-

ionship rendered visible. As if for the first time in my life I could be content to be human without having to forego, because of that limitation, my intuition of divine order.

(50) January 26: My daughter and I made our way, maps clutched in our hands, back to the Louvre.

The Louvre rolled up a lifetime’s study of art into a pellet and spat it out in my ignorant face. Corridors dimensionless as those in nightmares were lined with art of such authority that I stood as much aghast as dazzled.

Whenever I have seen art in its land of origin, I have been struck by its reliance on place. In America, Japanese art looks withdrawn into itself, as if stiffened in self-defense; Australian Aboriginal art, unutterably powerful in Australia, loses meaning, can even look merely decorative, when carted off that continent, losing force as visibly as a rainbow trout fades when cast onto the bank of a river. The European art I have seen in America seems anemic in comparison to what I am seeing here. By the same token, I sometimes wish that photography were solely the domain of artists who photograph rather than a tool so commonly used for the reproduction of artworks. Reproduction fatally weakens the force of art, reducing its presence to mere information and thus rendering it accessible in a way that makes it easy to miss the point of it.

*Formerly a royal palace, the Louvre was turned into a public art museum after the French Revolution.

21 The passage creates an impression of the author as a person who is

- (A) timid and indecisive
- (B) bitter and full of regrets
- (C) thoughtful and introspective
- (D) headstrong and impetuous
- (E) jovial and gregarious

22 In lines 7-10, the author discusses French money in order to make which point?

- (A) Artists are held in esteem in French culture.
- (B) People value art primarily as an investment.
- (C) The author did not know what to expect in a foreign country.
- (D) People in France are not as materialistically oriented as are people in the United States.
- (E) The author’s finances influenced her feelings about her trip.

NOTE: The reading passages in this test are brief excerpts or adaptations of excerpts from published material. The ideas contained in them do not necessarily represent the opinions of the College Board or Educational Testing Service. To make the text suitable for testing purposes, we may in some cases have altered the style, contents, or point of view of the original.

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2**2****2****2****2****2****2****2**

- 23** The concern expressed by the author in the second and third paragraphs (lines 7-28) centers on
- (A) what she will discover about herself
 - (B) the uncertainty of the future
 - (C) the reception that her artworks will receive
 - (D) whether she should emigrate to Europe
 - (E) her relationships with other artists
- 24** "Something stubborn in me" (line 14) is used by the author as a reflection of her
- (A) dislike of European styles of painting
 - (B) determination not to be identified as a foreigner
 - (C) desire to travel independently in a foreign city
 - (D) compulsion to master a new language and culture
 - (E) pride in her own accomplishments
- 25** The English artist's message (lines 25-28) indicates that artist's opinion that
- (A) the author has been unaware of the extent to which European art has influenced her work
 - (B) the author's visit to Paris will radically alter the nature of her future work
 - (C) the author's previous work has been unduly dependent on European styles
 - (D) European artists have much to learn from the author
 - (E) all artists need to leave their own countries in order to gain perspective
- 26** The "American voice" described in lines 35-39 represents an attitude of
- (A) awe aroused by the beauty of the Louvre
 - (B) eagerness to be enriched by new ideas about art
 - (C) painful insignificance when standing next to such a grand building
 - (D) critical evaluation of the Louvre in terms of its historical context
 - (E) surprise because American art seems decadent compared to European art
- 27** In line 62, the phrase "carted off" suggests a process of transporting objects that is
- (A) inefficient and antiquated
 - (B) accomplished only with great effort
 - (C) slow and ponderous
 - (D) performed in a rough and thoughtless manner
 - (E) stealthy and possibly illegal
- 28** The author likens art to a "rainbow trout" (lines 63-64) in order to
- (A) stress the importance of color in art
 - (B) suggest art's dependence on its environment
 - (C) mock those who prefer abstract painting
 - (D) argue that art must be grounded in a reverence for nature
 - (E) compare the activity of painting to mundane pursuits
- 29** The discussion of photography (lines 66-73) reveals the author's assumption that
- (A) painting is superior to photography as an art form
 - (B) some viewers cannot distinguish a reproduction from an original
 - (C) the essence of an artwork cannot be conveyed through reproductions
 - (D) reproductions of famous paintings enable everyone to view them with insight
 - (E) works of art often are inexpertly reproduced
- 30** The author would be most likely to endorse an art education program that stressed
- (A) the study of artworks in the context of their place of origin
 - (B) a thorough grounding in the artworks made in one's own region
 - (C) the use of reproductions of famous artworks
 - (D) creating original paintings rather than studying those of others
 - (E) analyzing a culture's history before studying its artistic tradition

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

STOP

Section 4

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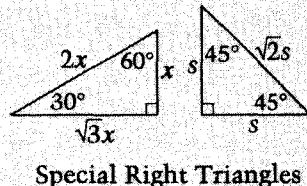
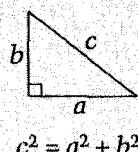
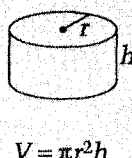
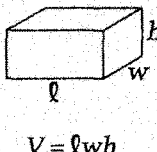
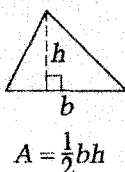
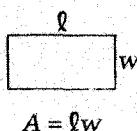
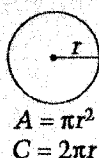
Time—30 Minutes
25 Questions

This section contains two types of questions. You have 30 minutes to complete both types. You may use any available space for scratchwork.

Notes:

1. The use of a calculator is permitted. All numbers used are real numbers.
2. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

Reference Information



The number of degrees of arc in a circle is 360.
The measure in degrees of a straight angle is 180.
The sum of the measures in degrees of the angles of a triangle is 180.

Directions for Quantitative Comparison Questions

Questions 1-15 each consist of two quantities in boxes, one in Column A and one in Column B. You are to compare the two quantities and on the answer sheet fill in oval

- A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

AN E RESPONSE WILL NOT BE SCORED.

Notes:

1. In some questions, information is given about one or both of the quantities to be compared. In such cases, the given information is centered above the two columns and is not boxed.
2. In a given question, a symbol that appears in both columns represents the same thing in Column A as it does in Column B.
3. Letters such as x , n , and k stand for real numbers.

EXAMPLES

Column A

Column B

Answers

E1

5^2

20

☒ (A) ☐ (B) ☐ (C) ☐ (D) ☐ (E)

E2

x

30

☐ (A) ☐ (B) ☒ (C) ☐ (D) ☐ (E)

E3

$r + 1$

$s - 1$

☐ (A) ☐ (B) ☐ (C) ☒ (D) ☐ (E)

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Section 4

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SUMMARY DIRECTIONS FOR COMPARISON QUESTIONS

Answer: A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A

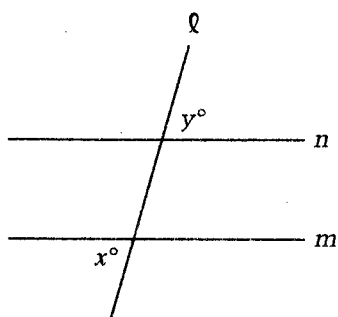
Column B

The number z is 8 less than the number t .

1

z

t



$n \parallel m$

2

x

y

The total cost of 2 apples and 3 oranges is \$1.70.

3

The cost of one apple

The cost of one orange

$$1.2 = \frac{k}{10}$$

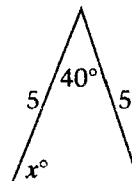
4

k

10

Column A

Column B



5

x

50

x is a member of the set $\{-1, 0, 3, 5\}$.
 y is a member of the set $\{-2, 1, 2, 4\}$.

6

$x - y$

-6

Points P , Q , R , and S are each on a circle with center O and radius 10.

7

The length of PQ

The length of RS

GO ON TO THE NEXT PAGE

SUMMARY DIRECTIONS FOR COMPARISON QUESTIONS

Answer: A if the quantity in Column A is greater;
 B if the quantity in Column B is greater;
 C if the two quantities are equal;
 D if the relationship cannot be determined from the information given.

Column A

Column B

$$\frac{s}{t} = \frac{2}{3}$$

$$9s^2$$

$$4t^2$$

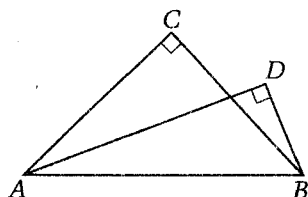
Column A

Column B

$$5 < 2x - 1 < 9$$

$$x$$

$$\frac{9}{2}$$



$$(AC)^2 + (BC)^2$$

$$(AD)^2 + (BD)^2$$

Twenty-seven white cubes of the same size are put together to form a larger cube. The larger cube is painted blue.

The number of the smaller cubes that have exactly three blue faces

$$9$$

$$\begin{aligned} a &= 3b \\ b &> 0 \end{aligned}$$

$$a + b$$

$$a \times b$$

$$\begin{aligned} w + x + y + z &= 0 \\ w \cdot x \cdot y \cdot z &\neq 0 \end{aligned}$$

$$w^2 + x^2 + y^2 + z^2$$

$$(w + x + y + z)^2$$

The average (arithmetic mean) of 3 integers a , b , and c is 40.

The average (arithmetic mean) of a , b , c , and 39

$$40$$

$$s - r = t - s = m - t = v - m = w - v$$

$$t - r$$

$$(w - v) + (t - s)$$

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Directions for Student-Produced Response Questions

Each of the remaining 10 questions requires you to solve the problem and enter your answer by marking the ovals in the special grid, as shown in the examples below.

Answer: $\frac{7}{12}$ or $7/12$ Answer: 2.5 Answer: 201
Either position is correct.

Write answer in boxes. ← Fraction line ← Decimal point

Grid in result.

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one oval in any column.
- Because the answer sheet will be machine-scored, **you will receive credit only if the ovals are filled in correctly.**
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the ovals accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $2\frac{1}{2}$ must be gridded as 2.5 or 5/2. (If $\frac{2\frac{1}{2}}{2}$ is gridded, it will be interpreted as $\frac{21}{2}$, not $2\frac{1}{2}$.)

- **Decimal Accuracy:** If you obtain a decimal answer, **enter the most accurate value the grid will accommodate.** For example, if you obtain an answer such as 0.6666..., you should record the result as .666 or .667. **Less accurate values such as .66 or .67 are not acceptable.**

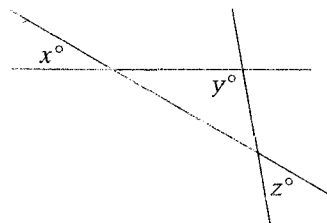
Acceptable ways to grid $\frac{2}{3} = .6666\dots$

	2	/	3				
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6

.	6	6	6				
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6

.	6	6	7				
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6

- 16 If $5ab + 1 = 1$, what is the value of ab ?



Note: Figure not drawn to scale.

- 17 In the figure above, if $x = 25$ and $z = 30$, what is the value of y ?

GO ON TO THE NEXT PAGE

- 18** The integer m is between 40 and 100. When m is divided by 3, the remainder is 2. When m is divided by 7, the remainder is 1. What is one possible value of m ?

- 20** Ten consecutive integers are arranged in order from least to greatest. If the sum of the first five integers is 200, what is the sum of the last five integers?

- 19** In a group study on nutrition, the average daily intake of calories per person was 8 percent higher in April than it was in March. If this average was 3,200 calories in March, what was the average daily intake of calories per person in April?

- 21** If the points $P(-2, 6)$, $Q(-2, 1)$, and $R(2, 1)$ are vertices of a triangle, what is the area of the triangle?

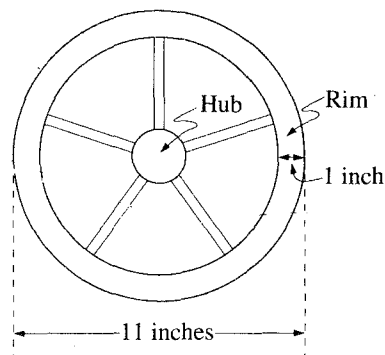


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- 22** If a pound of grass seed covers an area of 500 square feet and costs \$3.25, what is the cost, in dollars, of the seed needed to cover a level rectangular area that measures 200 feet by 300 feet? (Disregard \$ sign when gridding your answer.)

- 23** The expression $\frac{3x-1}{4} + \frac{x+6}{4}$ is how much more than x ?

- 24** What is the least positive integer n for which $12n$ is the cube of an integer?



- 25** A wheel has an outer diameter of 11 inches, as shown above. The rim is 1 inch wide and the diameter of the hub is 2 inches. If each spoke extends $\frac{1}{2}$ inch into the hub and $\frac{1}{2}$ inch into the rim, what is the sum of the lengths of the five spokes, in inches?

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

STOP

Section 5

5

Time — 30 Minutes
35 Questions

For each question in this section, select the best answer from among the choices given and fill in the corresponding oval on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Medieval kingdoms did not become constitutional republics overnight; on the contrary, the change was ----.

- (A) unpopular
- (B) unexpected
- (C) advantageous
- (D) sufficient
- (E) gradual

(A) (B) (C) (D) (E)

- 1 Whether Mitsuko Uchida is performing music or merely discussing it, the pianist's animated demeanor ---- her passion for her vocation.
- (A) misrepresents (B) exaggerates
(C) satisfies (D) reflects (E) disguises
- 2 One of the factors that ---- the understanding of the nature of cells was the limited resolution of early microscopes.
- (A) aided (B) discredited (C) increased
(D) contradicted (E) restricted
- 3 The congresswoman is very powerful: she has more ---- than any other member of the committee.
- (A) integrity (B) influence (C) restraint
(D) discrimination (E) pretense
- 4 Anyone who possesses perceptiveness, insight, and unflagging vitality has invaluable ----, but the rare individual who also possesses the ability to ---- these qualities through art has genius.
- (A) prospects. .delegate
(B) gifts. .express
(C) traits. .forbid
(D) flaws. .impute
(E) visions. .bequeath

- 5 Each male mockingbird views his territory as ----; no other male of the same species is tolerated within its boundaries.
- (A) circuitous (B) inviolable (C) dissipated
(D) unparalleled (E) mandated
- 6 To summarize an article is to separate that which is ---- from the ---- material that surrounds it.
- (A) notable. .primary
(B) undesirable. .encompassing
(C) fundamental. .vital
(D) essential. .supporting
(E) explanatory. .characteristic
- 7 Sometimes fiction is marred by departures from the main narrative, but Toni Morrison's *The Bluest Eye* is instead ---- by its ----, which add levels of meaning to the principal story.
- (A) enhanced. .digressions
(B) harmed. .excursions
(C) adorned. .melodramas
(D) strengthened. .criticisms
(E) unaffected. .swervings
- 8 According to the report, the investment firm had ---- several customers, swindling them out of thousands of dollars.
- (A) harassed (B) sullied (C) bilked
(D) investigated (E) incriminated
- 9 Because this novel is not so narrowly concerned with ---- political issues, it seems as ---- today as it did two hundred years ago.
- (A) momentary. .derivative
(B) evanescent. .nostalgic
(C) transient. .fresh
(D) sagacious. .wise
(E) dated. .quaint
- 10 Contemptuous of official myths about great men and women that had been taught to them in school, many postwar writers, with the skepticism expected of ----, advanced the idea that there was no such thing as greatness.
- (A) idealists (B) well-wishers
(C) dissemblers (D) nitpickers
(E) debunkers

GO ON TO THE NEXT PAGE

Each question below consists of a related pair of words or phrases, followed by five pairs of words or phrases labeled A through E. Select the pair that best expresses a relationship similar to that expressed in the original pair.

Example:

CRUMB : BREAD ::

- (A) ounce : unit
- (B) splinter : wood
- (C) water : bucket
- (D) twine : rope
- (E) cream : butter

(A) ● (C) (D) (E)

11 OSTRICH : BIRD ::

- (A) lion : cat
- (B) goose : flock
- (C) ewe : sheep
- (D) cub : bear
- (E) primate : monkey

12 WORD : LANGUAGE ::

- (A) paint : portrait
- (B) poetry : rhythm
- (C) note : music
- (D) tale : story
- (E) week : year

13 COOP : POULTRY ::

- (A) aquarium : fish
- (B) forest : wildlife
- (C) crib : nursery
- (D) fence : yard
- (E) barn : tool

14 LEGEND : MAP ::

- (A) subtitle : translation
- (B) bar : graph
- (C) figure : blueprint
- (D) key : chart
- (E) footnote : information

15 BILLBOARD : ADVERTISEMENT ::

- (A) sculpture : museum
- (B) store : window
- (C) library : book
- (D) canvas : painting
- (E) theater : intermission

16 CUSTOM : SOCIETY ::

- (A) hypothesis : evidence
- (B) testimony : trial
- (C) ballot : election
- (D) rule : game
- (E) contest : debate

17 TUNNEL : MINE ::

- (A) conduit : fluid
- (B) corner : intersection
- (C) sign : detour
- (D) aisle : seat
- (E) corridor : building

18 DIVERSION : BOREDOM ::

- (A) assurance : uncertainty
- (B) enmity : hatred
- (C) secrecy : curiosity
- (D) reward : deed
- (E) sluggishness : fatigue

19 THICKET : SHRUBS ::

- (A) grove : trees
- (B) orchard : apples
- (C) pasture : cows
- (D) reef : waves
- (E) crop : plants

20 CONDESCENDING : RESPECT ::

- (A) bashful : attention
- (B) obliging : thanks
- (C) insecure : doubt
- (D) merciless : compassion
- (E) pathetic : pity

21 LIVID : ANGER ::

- (A) querulous : reconciliation
- (B) forlorn : hope
- (C) radiant : happiness
- (D) graceful : posture
- (E) marvelous : wonder

22 FATHOM : DEPTH ::

- (A) amplify : volume
- (B) overflow : capacity
- (C) appraise : value
- (D) stump : answer
- (E) weigh : scale

23 REMUNERATION : LABOR ::

- (A) gratuity : bonus
- (B) apology : regret
- (C) pledge : donation
- (D) trophy : victory
- (E) debt : loan

GO ON TO THE NEXT PAGE

The passage below is followed by questions based on its content. Answer the questions on the basis of what is stated or implied in the passage and in any introductory material that may be provided.

Questions 24-35 are based on the following passage.

The following excerpt by an anthropologist represents one point of view in the ongoing debate about cultural influences in the United States.

On a hot Friday afternoon in the last week of August, cars, pickup trucks, campers, and school buses slowly pull into a park on the edge of Fargo, North Dakota. Families carve out small pieces of territory around their vehicles, making the park into a series of encampments. As they have done for generations, American Indians of the Great Plains gather once again for an annual powwow. Donning their traditional clothing, Ojibwa, Lakota, and Dakota people assemble for several days of celebration and ceremony.

To an outside observer attending for the first time, this year's powwow may appear chaotic. Even though posted signs promise that dances will begin at four o'clock, there is still no dancing at five-thirty, and the scheduled drummers never arrive. No one is in charge; the announcer acts as a facilitator of ceremonies, but no chief rises to demand anything of anyone. Everyone shows great respect for the elders and for the dancers, who are repeatedly singled out for recognition, but at the same time children receive attention for dancing, as does the audience for watching. Eventually the program grows in an organic fashion as dancers slowly become activated by drums and singing. Each participant responds to the mood of the whole group but not to a single, directing voice, and the event flows in an orderly fashion like hundreds of powwows before it.

This apparent penchant for respectful individualism and equality within an American Indian group seems as strong today to a non-Indian observer in Fargo as it did five centuries ago to early European explorers. Much to the shock of the first European observers and to the dismay of bureaucratic individuals, American Indian societies have traditionally operated without strong positions of leadership or coercive political institutions.

Adventure novels and Hollywood films set in the past often portray strong chiefs commanding their tribes. More often, however, as in the case of the Iroquois people, a council of sachems, or legislators, ruled, and any person called the "head" of the tribe usually occupied a largely honorary posi-

tion of respect rather than power. Chiefs mostly played ceremonial and religious roles rather than political or economic ones. Unlike the familiar words "caucus" and "powwow," which are Indian-derived and indicative of American Indian political traditions, the word "chief" is an English word of French origin that British officials tried to force onto American Indian tribes in order that they might have someone with whom to trade and sign treaties.

In seventeenth-century Massachusetts the British tried to make one leader, Metacom of the Wampanoag people, into King Philip, thereby imputing monarchy to the American Indian system when no such institution existed. Thus while certain English settlers learned from groups like the Iroquois people how to speak and act in group councils, others simultaneously tried to push American Indians toward a monarchical and therefore less democratic system.

By the late 1600's the Huron people of Canada had already interacted for decades with European explorers and traders and were thus able to compare their own way of life with that of the Europeans. The Hurons particularly decried the European obsession with money. By contrast, the Hurons lived a life of liberty and equality and believed that the Europeans lost their freedom in their incessant use of "thine" and "mine." One Huron explained to the French adventurer and writer Baron de La Hontan, who lived among the Hurons for eleven years, that his people were born free and united, each as great as the other, while Europeans were all the slaves of one sole person. "I am the master of my body," he said, "... I am the first and the last of my Nation . . . subject only to the great Spirit." These words recorded by La Hontan may have reflected the Frenchman's own philosophical bias, but his book rested on a solid factual base: the Huron people lived without social classes, without a government separate from their kinship system, and without private property. To describe this situation, La Hontan revived the Greek-derived word "anarchy," using it in the literal sense to mean "no ruler." La Hontan found

GO ON TO THE NEXT PAGE

an orderly society, but one lacking a formal government that compelled such order.

- The descriptions by La Hontan and other European travelers of the so-called anarchy among the American Indians contributed to several different brands of anarchistic theory in the nineteenth century. Today, anarchism is often equated with terrorism and nihilism (denial of values), but early anarchism lacked those characteristics. Pierre Joseph Proudhon (1809-1865), the author of modern anarchistic theory, stressed the notion of "mutualism" in a society based on cooperation without the use of coercion from any quarter.

- Like certain American plants that were introduced throughout the world and that found new surroundings in which to flourish, the examples of liberty and individuality in American Indian societies spread and survived in other surroundings. Today, in the ordered anarchy of a powwow in North Dakota, these same values are articulated more eloquently than in the writings of most political theorists.

- 24 The first two paragraphs (lines 1-29) serve all of the following purposes EXCEPT to

- (A) provide a narrative account to serve as an introduction
- (B) contrast American Indian social events with individual performances
- (C) create a sense of the permanence of some American Indian customs
- (D) inform the reader about the nature of a powwow
- (E) lead to a discussion of an important political concept

- 25 In line 14, the author uses the word "promise" to reflect the

- (A) outsider's misunderstanding of linguistic variations
- (B) outsider's inability to be punctual
- (C) outsider's inappropriate expectations
- (D) announcer's frustration at the unexpected delay
- (E) drummers' commitment to training a new generation in their art

- 26 Paragraph four (lines 40-55) suggests which of the following concerning Iroquois tribal "heads" of three hundred years ago?

- (A) They were appointed by the European settlers.
- (B) They were rarely present at ceremonial gatherings.
- (C) Their people expected them to negotiate on their behalf.
- (D) They did not wield as much power as the tribal councils did.
- (E) They adjudicated conflicts within their own tribes.

- 27 Which conclusion concerning the term "caucus" (line 49) is most directly supported by the passage?

- (A) Its use today reflects the influence of American Indian traditions.
- (B) It is a word derived from French and transplanted to frontier America.
- (C) It is a term synonymous with a European-style monarchy.
- (D) It represents a misinterpretation of the idea of political anarchy.
- (E) It refers to a convening of British officials and American Indian leaders.

- 28 The passage implies that the image of the monarchical American Indian leader originated in

- (A) the writings of French political theorists
- (B) the personal narratives of early American Indian leaders
- (C) representative legends from diverse North American tribes
- (D) European assumptions about social structure
- (E) medieval European myths about undiscovered western lands

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29. In line 74, "thine" and "mine" are used to illustrate
- (A) the mutual respect that Hurons felt for each other
 - (B) the verbal expression of liberating ideas
 - (C) a notion that La Hontan encouraged the Hurons to accept
 - (D) the importance of property in European society
 - (E) terms of address between French explorers and American Indians
30. In the context of the passage, the statement "I am the master . . . Spirit" (lines 80-82) implies that the person being quoted
- (A) accepted political rebellion only as a measure of last resort
 - (B) thought of himself as the leader of his people
 - (C) had been designated to participate in the founding of a new nation
 - (D) believed that a class structure undermined individual freedom
 - (E) felt the weight of spiritual responsibility for humankind
31. If La Hontan's writing did, in fact, reflect his "philosophical bias" (line 84), it can be inferred that as a philosopher he was most likely motivated by a desire to
- (A) misrepresent the Hurons' views about European society
 - (B) reform French society in order to gain more authority
 - (C) become a mentor to the Huron society
 - (D) describe an aspect of his many adventures
 - (E) encourage greater democracy in French society
32. Which statement best describes the relationship between Proudhon's theory and seventeenth century Huron practices discussed in lines 93-103?
- (A) An influential idea was publicized by those who had helped formulate it.
 - (B) An intellectual argument was based on Proudhon's own experiences.
 - (C) Practical suggestions by nonspecialists were incorporated into a system of thought.
 - (D) A scholar's perceptions were modified only after comparison with a historical example.
 - (E) The development of an abstract concept was influenced by an observed phenomenon.
33. In line 96, "brands" most nearly means
- (A) marks
 - (B) manufactures
 - (C) varieties
 - (D) logos
 - (E) identifications
34. In line 103, "quarter" is best understood as meaning
- (A) fourth part
 - (B) monetary unit
 - (C) person or group
 - (D) dwelling place
 - (E) indefinite point or place
35. In the sentence beginning "Like certain . . ." (lines 104-108), the author's approach shifts from
- (A) manipulating highly charged rhetoric to introducing a counterappeal
 - (B) supplying selected historical references to using figurative language
 - (C) analyzing a process unemotionally to suggesting mild disapproval
 - (D) expressing skepticism to invoking cautious praise
 - (E) employing veiled blame to summarizing concepts optimistically

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

STOP

Time—15 Minutes
13 Questions

For each question in this section, select the best answer from among the choices given and fill in the corresponding oval on the answer sheet.

The two passages below are followed by questions based on their content and on the relationship between the two passages. Answer the questions on the basis of what is stated or implied in the passages and in any introductory material that may be provided.

Questions 1-13 are based on the following passages.

Radio astronomy, the science dealing with radio waves originating beyond the Earth's atmosphere, began with an accidental discovery made by Karl Jansky, an engineer at Bell Telephone Laboratories in New Jersey. Jansky was studying the sources of atmospheric radio static as part of an effort to improve overseas telephone transmission when, while scanning the sky with a shortwave antenna, he picked up a new kind of static. Passage 1 is from an article describing Jansky's work; Passage 2 is from a speech given in the early 1980's by Grote Reber, another pioneering radio astronomer.

Passage 1

Line
(5) In August 1931 Jansky first recognized a new, weak component of static, faintly audible with headphones. Like static at other frequencies, it was strongest around the time of electrical storms, but the source of this static moved across the southern sky in a regular east-to-west pattern. Jansky wrote in his work report: "The reason for this phenomenon is not yet known, but it is believed that a study of the known thunderstorm areas of the world will reveal the cause."
(10) In August the static was a nighttime phenomenon, but when it persisted through the autumn and began to shift to different times of day, Jansky became intrigued. Early on, he called it "Sun static,"
(15) for the direction of arrival seemed to coincide quite closely with the Sun's position. But by February its daily peak was preceding the Sun by as much as an hour.
(20) In December 1932 Jansky reviewed his entire year's data and noticed the precision in the shift of the overall pattern. After one year the pattern had slipped exactly one day—the peak signal was now in the south at the same time of day as it had been the previous December. To an astronomer this
(25) kind of shift is a fact of life—a star or other source fixed in celestial coordinates rises four minutes earlier each day (with respect to the Sun) as a result of the Earth orbiting the Sun; after a year, this slippage amounts to one day. But to a communications engineer, the connection is not at all obvious. It may have been Jansky's friend Melvin Skellett who provided the key suggestion. Skellett was leading a highly unusual life, simultaneously
(30) working as a radio engineer for Bell Labs and pursuing graduate studies in astronomy. By late

December, Jansky had consulted Skellett and had learned a good bit about astronomical coordinates. Jansky wrote in a letter: "I have taken more data which indicate definitely that the stuff, whatever it is, comes from something not only extraterrestrial, but from outside the Solar System."
(40)

Meanwhile, he began writing a paper about his findings, although apparently without much support from Harald Friis, his supervisor. In another letter Jansky wrote: "My records show that this static comes from a direction fixed in space. The evidence I have is conclusive and, I think, very startling. When I first suggested the idea of publishing something about it to Friis, he was somewhat skeptical and wanted more data.
(45) Frankly, I think he was scared."
(50)

Thus it is that Jansky's 1933 paper, one of the most important in the astronomy of this century, has the relatively cautious title "Electrical Disturbances Apparently of Extraterrestrial Origin."
(55)

In the paper Jansky proposed the center of the Milky Way galaxy as one possible origin of the static. Further study, however, proved confusing, for the daily time of arrival was not behaving as regularly (based on the assumption of a single source) as it should have. Soon Jansky realized that the static was coming not from the galactic center but from the entire galaxy.
(60)

GO ON TO THE NEXT PAGE

Passage 2

I have been asked about the early lack of interest in radio astronomy by the astronomical community. In retrospect, there appear to have been two difficulties. First, the astronomers had a nearly complete lack of knowledge of electronic apparatus, viewing it as magical and sinister. Second, and more important, the astrophysicists could not dream up any rational way by which the radio waves could be generated, and since they didn't know of such a process, the whole affair was at best a mistake and at worst a hoax. I've encountered this attitude at other times and places. If the why and how are not known, observations are discounted by the intelligentsia. By contrast, the engineering fraternity had a clear understanding of the electronic equipment. More important, they were not inhibited by mental hang-ups about the origin of the radio waves. On that subject, their attitude was—who cares?

The pundits of Marconi's* day said his ideas about wireless radio would not work because radio waves were similar to light and would not bend around the curvature of the Earth. Even after Marconi's successful transatlantic radio transmission in 1901, many doubted his results because there was no known way radio waves would perform as he reported. However, the telegraphic cable company believed him. They served him with a writ to cease and desist because they had an exclusive monopoly on transatlantic communication. As usual the intelligentsia fell flat on its face.

*Guglielmo Marconi (1874-1937), Nobel Prize-winning physicist and inventor of wireless radio

1 As described in the first paragraph of Passage 1 (lines 1-10), Jansky first became curious about the new static because

- (A) its cause did not seem to be electrical
- (B) its source moved in a distinctive pattern
- (C) it was stronger than other static
- (D) it occurred at all frequencies
- (E) it was rarely observed during thunderstorms

2 The author of Passage 1 uses the phrase "a fact of life" (line 25) to indicate

- (A) a challenge that every person must eventually confront
- (B) an obstacle that astronomers must overcome
- (C) part of an astronomer's body of basic knowledge
- (D) something that is evident even to a child
- (E) something that Jansky was afraid to face

3 Passage 1 suggests that Skellett played what role in Jansky's research?

- (A) He spotted a flaw in Jansky's method of gathering data.
- (B) He suggested a crucial improvement to Jansky's antenna.
- (C) He corrected an error in Jansky's mathematical calculations.
- (D) He helped Jansky to interpret the pattern of his data.
- (E) He informed Jansky about new developments in theoretical physics.

4 What does Passage 1 suggest about the title of Jansky's 1933 paper (lines 52-55) ?

- (A) It was entirely misleading.
- (B) It did not convey the discovery's importance.
- (C) It was unacceptable to Friis.
- (D) It would have been comprehensible only to engineers.
- (E) It made light of an important problem emerging in science.

5 In line 58, "proved" most nearly means

- (A) turned out
- (B) made clear
- (C) tested
- (D) verified
- (E) refined

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- 6 In Passage 2, Reber suggests that the astronomers had which attitude toward electronic equipment (lines 67-69) ?
- (A) They were impatient with its limitations.
 - (B) They took it for granted.
 - (C) They relied too heavily on it.
 - (D) They had an unreasonable aversion to it.
 - (E) They believed it would revolutionize their field.
- 7 In Passage 2, "the whole affair was at best a mistake" (lines 73-74) is presented as the opinion of
- (A) Reber
 - (B) Jansky
 - (C) Marconi
 - (D) the engineers
 - (E) the astrophysicists
- 8 In Passage 2, Reber most likely believes that when attempting to interpret puzzling data one should
- (A) reject the reports of previous observers
 - (B) derive new theoretical principles
 - (C) keep an open mind
 - (D) be especially on guard against a hoax
 - (E) assume that the most outlandish explanation is probably the most correct
- 9 In Passage 2, Reber describes Marconi's work chiefly in order to
- (A) disparage the narrow-mindedness of some of the scientific community
 - (B) illustrate the dangers of commercial control over science
 - (C) suggest why Jansky's discovery was greater than Marconi's
 - (D) show that theoretical science is superior to applied science
 - (E) criticize the attitude of the industrialists of Marconi's day
- 10 The two passages approach radio astronomy differently in that Passage 1
- (A) points out Jansky's originality while Passage 2 stresses his debt to his colleagues
 - (B) criticizes Friis while Passage 2 defends his reasoning
 - (C) emphasizes its inception while Passage 2 describes the early response to it
 - (D) is based on an assumption that Passage 2 reveals to be erroneous
 - (E) explores the theoretical aspect of science while Passage 2 stresses its danger to society
- 11 The passages differ in tone in that Passage 1 is
- (A) enthusiastic while Passage 2 is cautious
 - (B) indignant while Passage 2 is nostalgic
 - (C) matter-of-fact while Passage 2 is sarcastic
 - (D) sensationalistic while Passage 2 is understated
 - (E) scornful while Passage 2 is uncritically admiring
- 12 Friis's attitude as presented in Passage 1 (lines 48-51) is most similar to whose attitude in Passage 2 ?
- (A) Marconi's
 - (B) The cable company's
 - (C) The engineering fraternity's
 - (D) Reber's
 - (E) The intelligentsia's
- 13 Both passages illustrate the idea that scientists should
- (A) resist the power of preconceived notions
 - (B) keep scrupulously accurate records
 - (C) make sure that their electronic equipment is up-to-date
 - (D) compare experimental results with those of other researchers
 - (E) achieve a solid grounding in theoretical principles

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

STOP

Section 7

7

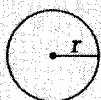
Time—15 Minutes
10 Questions

In this section solve each problem, using any available space on the page for scratchwork. Then decide which is the best of the choices given and fill in the corresponding oval on the answer sheet.

Notes:

1. The use of a calculator is permitted. All numbers used are real numbers.
2. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

Reference Information

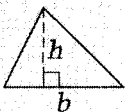


$$A = \pi r^2$$

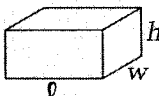
$$C = 2\pi r$$



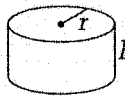
$$A = lw$$



$$A = \frac{1}{2}bh$$



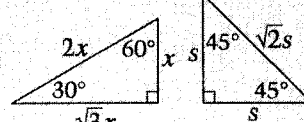
$$V = lwh$$



$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles

The number of degrees of arc in a circle is 360.

The measure in degrees of a straight angle is 180.

The sum of the measures in degrees of the angles of a triangle is 180.

1 If $a + 2 = 7$, then $(a + 3)^2 =$

- (A) 25
- (B) 36
- (C) 49
- (D) 64
- (E) 81

3 If $2^4 = 4^x$, then $x =$

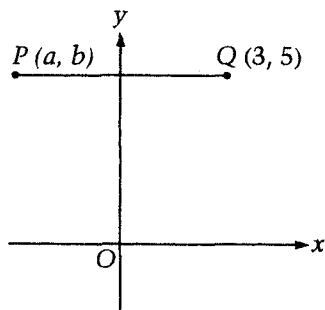
- (A) 1
- (B) 2
- (C) 4
- (D) 5
- (E) 8

$$\begin{array}{r} 13R \\ + R2 \\ \hline 19T \end{array}$$

- 2** R and T represent digits in the correctly worked addition problem above. What digit does T represent?

- (A) 4
- (B) 5
- (C) 6
- (D) 7
- (E) 8

GO ON TO THE NEXT PAGE



Note: Figure not drawn to scale.

- 4 In the figure above, if line segment PQ is parallel to the x -axis and has length 7, what is the value of a ?

(A) -4
 (B) -3
 (C) -2
 (D) 3
 (E) 5

Questions 5-6 refer to the following table.

Quiz Score	Number of Students Who Received That Score
0	3
1	6
2	7
3	4

A class of 20 students took a 3-question quiz. The table shows the possible scores on this quiz and the number of students who received each of these scores.

- 5 If one of the students is picked at random, what is the probability that that student's quiz score will be greater than 1?

(A) $\frac{1}{11}$
 (B) $\frac{1}{2}$
 (C) $\frac{11}{20}$
 (D) $\frac{2}{3}$
 (E) $\frac{7}{10}$

- 6 What is the average (arithmetic mean) of the scores for this class?

(A) 1.0
 (B) 1.5
 (C) 1.6
 (D) 1.9
 (E) 2.0

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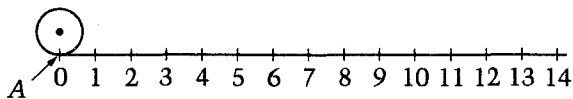
1,234, ... 1,920,21... ,484,950

The integer above is formed by writing the integers from 1 to 50, in order, next to each other. If the integer is read from left to right, what is the 50th digit from the left?

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 9

After Jean gave \$10 to Irene and Irene gave \$6 to Todd, Jean had \$10 more than Irene and \$20 more than Todd. Originally, how much more did Jean have than Irene and Todd?

- (A) \$14 more than Irene and \$16 more than Todd
- (B) \$18 more than Irene and \$24 more than Todd
- (C) \$18 more than Irene and \$26 more than Todd
- (D) \$24 more than Irene and \$26 more than Todd
- (E) \$24 more than Irene and \$36 more than Todd

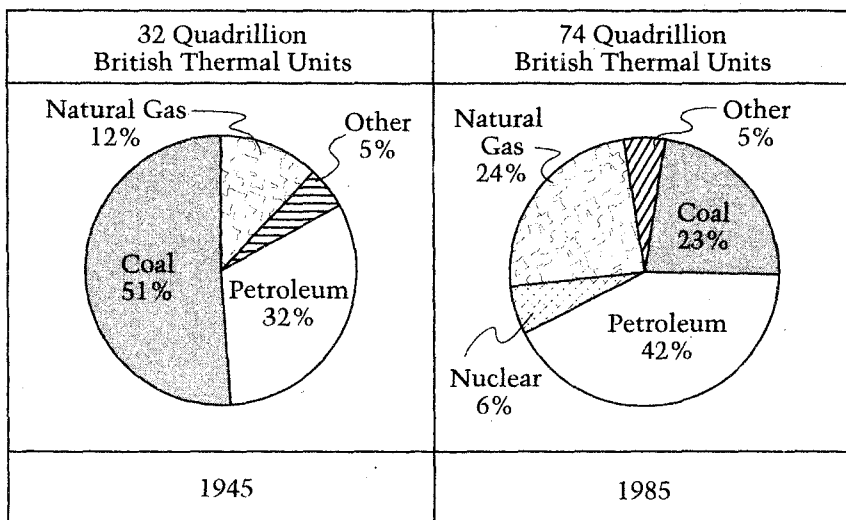


A circle of radius $\frac{2}{\pi}$ rolls to the right along the line shown above without slipping. In the starting position, point A on the circle touches the line for the first time at point 0 on the line. At what point on the line will point A touch the line for the fourth time?

- (A) 12
- (B) 10
- (C) 8
- (D) 6
- (E) 4

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TOTAL ENERGY CONSUMED IN THE UNITED STATES
IN 1945 AND IN 1985



- 10** According to the graphs above, for which energy source was the actual amount of energy consumed, in British thermal units, nearly the same in 1985 as in 1945 ?

- (A) Coal
- (B) Natural gas
- (C) Petroleum
- (D) Nuclear
- (E) Other

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

STOP

SAT 1: Reasoning Test Answer Key

Saturday, January 1997

[illegible]

NOTE: Difficulty levels are estimates of question difficulty for a recent group of college-bound seniors. Difficulty levels range from 1 (easiest) to 5 (hardest).

Score Conversion Table

SAT 1: Reasoning Test

Saturday, January 1997

Recentered Scale

Raw Score	Verbal Scaled Score	Math Scaled Score	Raw Score	Verbal Scaled Score	Math Scaled Score
78	800		37	520	570
77	800		36	510	560
76	800		35	510	550
75	800		34	500	540
74	780		33	500	540
73	760		32	490	530
72	750		31	490	520
71	730		30	480	520
70	720		29	470	510
69	710		28	470	500
68	700		27	460	500
67	690		26	460	490
66	680		25	450	480
65	670		24	450	480
64	670		23	440	470
63	660		22	430	460
62	650		21	430	460
61	640		20	420	450
60	640	800	19	420	440
59	630	800	18	410	440
58	630	770	17	400	430
57	620	750	16	390	420
56	610	740	15	390	410
55	610	720	14	380	410
54	600	710	13	370	400
53	600	700	12	360	390
52	590	690	11	360	380
51	590	680	10	350	370
50	580	670	9	340	370
49	580	660	8	330	360
48	570	650	7	320	350
47	570	640	6	310	340
46	560	630	5	290	320
45	560	630	4	280	310
44	550	620	3	260	300
43	550	610	2	250	280
42	540	600	1	220	270
41	540	600	0	200	250
40	530	590	-1	200	230
39	530	580	-2	200	210
38	520	570	-3	200	200
			and below		

This table is for use only with this test.